IN THE CLAIMS:

Please amend the claims as follows:

1. (Currently Amended) A method for forming a waveguide structure on a substrate surface, comprising:

forming a cladding layer on the substrate surface;

forming a core layer on the cladding layer;

depositing an amorphous carbon hardmask on the core layer;

forming a patterned photoresist layer on the amorphous carbon hardmask;

etching the amorphous carbon hardmask; and

etching the core ~~material~~ layer.

2. (Currently Amended) The method of claim 1, further comprising:

removing the amorphous carbon hardmask; and

depositing a cladding material on remaining portions of the core ~~material~~ layer and exposed portions of the cladding layer.

3. (Currently Amended) The method of claim 1, wherein the cladding layer ~~comprises a material having~~ has a refractive index lower than ~~the~~ a refractive index of the core ~~material~~ layer.

4. (Currently Amended) The method of claim 1, wherein the cladding layer comprises a material selected from the group consisting of undoped silicon dioxide, thermal oxides, or silicon dioxide doped with boron, phosphorous, and combinations thereof.

5. (Currently Amended) The method of claim 1, wherein the core ~~material~~ layer comprises a material selected from the group consisting of germanium doped silicon dioxide, germanium boron doped silicon dioxide silicon-germanium compositions,

phosphorous doped silicon dioxide, silicon oxynitride, silicon nitride, silicon, and combinations thereof.

6. (Currently Amended) The method of claim 1, wherein the core ~~material~~ layer comprises a light propagating channel.

7. (Original) The method of claim 1, wherein depositing the amorphous carbon hardmask comprises:

introducing into a processing chamber one or more hydrocarbon compounds having the general formula C_xH_y, wherein x has a range of 2 to 4 and y has a range of 2 to 10; and

generating a plasma of the one or more hydrocarbon compounds.

8. (Original) The method of claim 7, wherein the one or more hydrocarbon compounds are selected from the group consisting of propylene (C_3H_6), propyne (C_3H_4), propane (C_3H_8), butane (C_4H_{10}), butylene (C_4H_8), butadiene (C_4H_6), acetelyne (C_2H_2), and combinations thereof.

9. (Original) The method of claim 7, further comprising introducing an inert gas into the processing chamber.

10. (Currently Amended) The method of claim 1, wherein the etch selectivity of amorphous carbon to the core ~~material~~ layer is between about 1:8 and about 1:15.

11. (Currently Amended) A method for forming a waveguide structure on a substrate surface, comprising:

forming a first cladding layer on the substrate surface;

forming a core layer on the first cladding layer;

depositing an amorphous carbon hardmask on the core layer;

forming a patterned photoresist layer on the amorphous carbon hardmask;

etching the amorphous carbon hardmask;

etching the core ~~material~~ layer;

removing the amorphous carbon hardmask; and

forming a second cladding layer over the ~~exposed~~ core ~~material~~ layer.

12. (Currently Amended) The method of claim 11, wherein the first cladding layer ~~comprises a material having~~ has a refractive index lower than ~~the~~ a refractive index of the core ~~material~~ layer.

13. (Currently Amended) The method of claim 11, wherein the first cladding layer comprises a material selected from the group consisting of undoped silicon dioxide, thermal oxides, [[or]] silicon dioxide doped with boron, phosphorous, and combinations thereof, and the core material comprises a material selected from the group consisting of germanium doped silicon dioxide, germanium boron doped silicon dioxide silicon-germanium compositions, phosphorous doped silicon dioxide, silicon oxynitride, silicon nitride, silicon, and combinations thereof.

14. (Currently Amended) The method of claim 11, wherein the second cladding ~~material~~ layer comprises the same material as the first cladding ~~material~~ layer.

15. (Original) The method of claim 11, wherein the second cladding layer comprises a material selected from the group consisting of quartz, silicon oxide, fused silicon oxide, and combinations thereof.

16. (Currently Amended) The method of claim 11, further comprising:

depositing a ~~fill~~ layer of encapsulation material; and

planarizing the ~~fill~~ layer of encapsulation material to expose the core ~~material~~ layer prior to forming a second cladding layer over the ~~exposed~~ core ~~material~~ layer.

17. (Currently Amended) The method of claim 11, wherein the ~~fill~~ encapsulation material comprises a material having a refractive index lower than the refractive index of the core ~~material~~ layer.

18. (Currently Amended) The method of claim 11, wherein the core ~~material~~ layer has a refractive index higher than the refractive index of the first and second cladding layers.

19. (Original) The method of claim 11, wherein depositing the amorphous carbon hardmask comprises:

introducing into a processing chamber one or more hydrocarbon compounds having the general formula C_xH_y, wherein x has a range of 2 to 4 and y has a range of 2 to 10; and

generating a plasma of the one or more hydrocarbon compounds.

20. (Original) The method of claim 19, wherein the one or more hydrocarbon compounds are selected from the group consisting of propylene (C_3H_6), propyne (C_3H_4), propane (C_3H_8), butane (C_4H_{10}), butylene (C_4H_8), butadiene (C_4H_6), acetelyne (C_2H_2), and combinations thereof.

21. (Original) The method of claim 19, further comprising introducing an inert gas into the processing chamber.

22. (Original) The method of claim 11, wherein removing the amorphous carbon hardmask comprises exposing the amorphous carbon hardmask to a plasma of a hydrogen-containing gas or an oxygen containing gas.